Operative Vaginal Birth

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Abstract

There is a balance of risks and benefits with operative birth and obstetricians are often faced with dilemma of making difficult choice between operative vaginal birth and caesarean section when birth needs to be expedited at full cervical dilatation. Even for experienced clinicians, this decision making process can be extremely challenging particularly where experience with operative birth is limited.

There is now clear guidance from the RCOG and other Colleges for both decision making about, and performance of, operative birth and these have become the standard of care.

This chapter will explore the potential medico-legal implications of operative vaginal birth and outline strategies to reduce risk to both mother and infant through safe operative vaginal birth.

Introduction

Operative vaginal birth (OVB) as an intervention is undertaken with the purpose of enabling better maternal and/or neonatal outcomes than would result from the alternatives - a Caesarean section or not intervening at all.

OVB, when performed correctly, in an appropriate setting by an experienced and trained practitioner, usually results in better outcomes for women and their babies than a Caesarean section. Compared to OVB, Caesarean section performed at full cervical dilatation is associated with increased rates of:

- Major haemorrhage (RR 2.8)
- Prolonged hospital stay (RR 3.5)
- Baby admitted to neonatal intensive care (NICU) (RR 2.6)
- But lower rates of neonatal trauma (RR 0.6) (1)

Moreover, operative vaginal birth, when successful requires reduced analgesia requirement, can be expedited more quickly (2) and women are much more likely (>80%) to have a spontaneous vaginal birth in their next pregnancy (3,4). In addition, repeat CS may limit maternal choices in future pregnancies, increases the risk of abnormal placentation that carries significant maternal risks (5) and is associated with an increased risk of unexplained stillbirth in future pregnancies with a hazard ratio of 1.5 (6).

Within this broadly positive picture, there are some risks associated with OVB. In particular, poor performance of OVB is associated with preventable harms to mothers and their babies. A competent obstetrician should be able to appropriately counsel women about the benefits and risks of OVB and the alternatives, perform OVB using both forceps and ventouse, including at least one technique for rotational OVB (7), as well as anticipate and manage complications arising from OVB. This chapter will discuss the role of informed consent, potential complications, the merits and disadvantages of different instruments, and the management of potential complications of OVB.

Trends in OVB

There has been a decline in overall OVBs, in many parts of the world; in both developed and developing world settings. Furthermore, there has been a general decline in the use of forceps and an increase in the use of ventouse. In England prior to 1980, the great majority of OVBs were performed using forceps rather than ventouse (11.3% vs 0.7% of all births). These rates have nearly equalised, without a reduction in the absolute rate of OVB overall – in 2014 forceps were used in 7% of births and ventouse in 5.8% (8). This general trend for a reduction in forceps birth and a rise in ventouse has been mirrored in other settings; in Australia from 1991 to 2013 forceps deliveries reduced from 10% of births of 7% while ventouse increased from 2.5% to 11% (9,10).

The trend for fewer forceps births has been more marked in the USA where the rate of forceps use has drastically reduced from 5.1% of births in 1990 to 0.6% in 2013 (11), while in European countries, as early as 2004 there were no countries who reported national-level statistics in which forceps were performed more frequently than ventouse (12).

The rate of OVB in the UK is stable at around 12% of total births per annum. This correlates to around 70,000 to 80,000 women having an OVB within the UK every year – a significant group of women and babies and it is therefore important that obstetricians know how to, and are able to, provide good patient care in this high-risk environment.

Medico-legal climate

OVB may be associated with negative feelings about birth afterwards by both women (13) and their partners (14). This has contributed to a public environment where there can be a negative perception of OVB (15). Adverse events in OVB are often highly publicised in the popular press (16), have led to official notifications from regulators (17) and have resulted in at least one political attempt to ban OVB (15).

Furthermore, poorly performed OVB has a significant litigation cost: each case settled by NHS Resolution, between April 2000 and March 2010, had a mean value in excess of £580,000 (18), and accounted for 3% of maternity all claims by value (not including those in which the baby developed cerebral palsy due to failures in duty of care during an OVB).

Safe practice to reduce the risk of litigation associated with operative birth

The American College of Obstetrics & Gynaecology (ACOG) statement on patient safety provide the framework for safe care provision in obstetrics (19) describes 7 points:

1. Develop a commitment to encourage a culture of patient safety
2. Implement recommended safe medication practices
3. Reduce the likelihood of surgical errors
4. Improve communication with health care providers
5. Improve communication with patients
6. Establish a partnership with patients to improve safety
7. Make safety a priority in every aspect of practice

OVB can often the best option for the mother and baby in the second stage of labour but it is essential that the accoucheur performs a careful, accurate and comprehensive clinical assessment to confirm that the prerequisite conditions are met for safe vaginal operative delivery. Furthermore, an OVB should be performed by a practitioner with the training, experience and skills to expect to competently do so, formulate and put in place appropriate back-up plans (such as access to a theatre), know when to stop, and anticipate and manage potential complications.

The Royal College of Obstetrician and Gynaecologists has identified the essential pre-requisites for OVB:

Table 3. Prerequisites for operative vaginal delivery

Full abdominal and vaginal examination	Head is ≤1/5th palpable per abdomen
	Vertex presentation.
	Cervix is fully dilated and the membranes ruptured.
	Exact position of the head can be determined so proper placement of the instrument can be achieved.
	Assessment of caput and moulding.
	Pelvis is deemed adequate. Irreducible moulding may indicate cephalo–pelvic disproportion.
Preparation of mother	Clear explanation should be given and informed consent obtained.
	Appropriate analgesia is in place for mid-cavity rotational deliveries. This will usually be a regional block. A pudendal block may be appropriate, particularly in the context of urgent delivery.
	Maternal bladder has been emptied recently. In-dwelling catheter should be removed or balloon deflated.
	Aseptic technique.
Preparation of staff	Operator must have the knowledge, experience and skill necessary.
	Adequate facilities are available (appropriate equipment, bed, lighting).
	Back-up plan in place in case of failure to deliver. When conducting mid-cavity deliveries, theatre staff should be immediately available to allow a caesarean section to be performed without delay (less than 30 minutes). A senior obstetrician competent in performing mid-cavity deliveries should be present if a junior trainee is performing the delivery.
	Anticipation of complications that may arise (e.g. shoulder dystocia, postpartum haemorrhage)
	Personnel present that are trained in neonatal resuscitation

* Adapted from the Society of Obstetricians and Gynaecologists of Canada 2004[41] and the Royal Australian and New Zealand College of Obstetricians and Gynaecologists 2009[27,28]

Pre-procedure counselling and consent

Failures to provide adequate explanation and consent are major contributors to litigation associated with operative birth (20). In 2017, the General Medical Council Consent Guidelines recommend: "The doctor uses specialist knowledge and experience and clinical judgement, and the patient's views and understanding of their condition, to identify which investigations or treatments are likely to result in overall benefit for the patient. The doctor explains the options to the patient, setting out the potential benefits, risks, burdens and side effects of each option, including the option to have no treatment. The doctor may recommend a particular option which they believe to be best for the patient, but they must not put pressure on the patient to accept their advice". (21)

In the post-Montgomery era the decision-making process is a shared process between the patient and clinicians (22), which requires clinicians to both provide the information and also assimilate it, as well as to explain the risks and benefits of a recommended course of action (and alternative options). This may not always be practicable given that most, if not all operative births are performed as either an emergency, or at least an urgent intervention. For this reason the RCOG recommends that women should be informed in the antenatal period about operative vaginal delivery, particularly during their first pregnancy (7).

With this background, and in a post-Montgomery context, while OVB is often undertaken in an emergency, and can be safer than a Caesarean section, it is vital that women receive appropriate counselling prior to the procedure. Appropriate counselling should include the most severe complications as well as the most frequent for the procedure in question, as well as the alternative, and consent should ideally be provided in written form (21).

The Royal College of Obstetricians and Gynaecologists guideline identifies serious and frequently occurring risks:

Serious risks

Maternal:

- third- and fourth-degree perineal tear
- extensive or significant vaginal/vulval tear

Fetal:

- subgaleal haematoma, 3–6 in 1000 (uncommon)
- intracranial haemorrhage, 5–15 in 10 000 (uncommon)
- facial nerve palsy (rare)

Frequent risks

Maternal:

- postpartum haemorrhage, 1–4 in 10 (very common)
- vaginal tear/abrasion (very common)
- anal sphincter dysfunction/voiding dysfunction

Fetal

- forceps marks on face (very common)
- chignon/cup marking on the scalp (practically all cases of vacuum-assisted delivery) (very common)
- cephalhaematoma 1–12 in 100 (common)
- facial or scalp lacerations, 1 in 10 (common)
- neonatal jaundice /hyperbilirubinaemia, 5–15 in 100 (common)
- retinal haemorrhage 17–38 in 100 (very common)

* adapted from Consent Advice No. 11, Royal College of Obstetricians and Gynaecologists 2010

In addition to these risks, practitioners should also be aware as to how these risks and subsequent courses of action can differ depending on the patient characteristics, instrument and technique used, and be prepared to justify their decisions based on these.

Patient factors influencing risk

Higher rates of complications, including failure, shoulder dystocia, haemorrhage and fetal injury are associated with:

- Maternal BMI >30
- Estimated fetal weight >4000g
- Malposition
- Mid-cavity delivery or where head is 1/5th palpable per abdomen (7)

Operative vaginal births where any of the above factors are present should ideally be performed in an operating theatre where there is immediate recourse to Caesarean section.

Choice of instrument

A practitioner's choice of instrument should be made on the basis of the clinical examination and their own personal experience and training (7). However, within this there is considerable scope for tailoring of the instrument to the clinical situation, and a competent practitioner should be aware of the relative advantages and disadvantages of different instruments and communicate this, along with the rationale for choosing it, to the woman and her family prior to starting the procedure.

There are currently 2 main instruments: ventouse and forceps.

Ventouse

A ventouse *(Fr., cupping glass)* is any instrument that creates a negative pressure seal on the fetal head and uses this as an anchor point to apply traction. Common currently used examples are the silastic ventouse (Figure 1) and Kiwi ventouse (Clinical Innovations, Salt Lake City, USA) (Figure 2).

Figure 1. Silastic ventouse

Figure 2. Kiwi ventouse

The ventouse has been used in various iterations since the 1780s (23), but only since the 1950s has a relatively uniform design (mushroom-cup) been adopted, beginning in Scandinavia (24) and achieving widespread use following further development in Papua New Guinea in the 1990s (25) and robust evaluation in the UK in the early 2000s (26,27).

Risks specific to ventouse

Some risks only occur, or are more likely to occur with ventouse compared to forceps, and women should be specifically informed of this prior to any procedure.

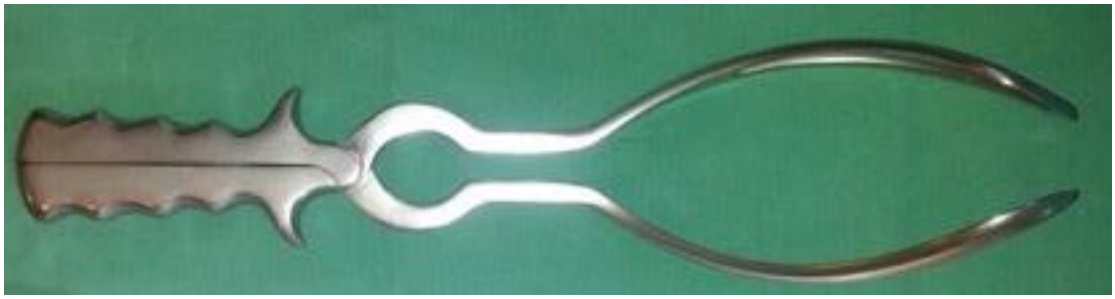
Risks more likely to occur during ventouse birth relative to forceps birth include:

- Failure – ventouse is more likely to fail and therefore require a secondary Caesarean section than forceps (RR 1.7).
- Cephalohaematoma – RR 2.4.
- Retinal haemorrhage – RR 2.0 (7). However, a recent systematic review has found that although common, retinal haemorrhage at birth almost always resolves by 6 weeks of age (28).

Forceps

Straight (non-rotational) forceps (including the eponymous Simpsons, Rhodes, Neville-Barnes & Andersons) are metal instruments designed to fit around a fetal head in the pelvic canal to expedite the birth (Figure 3).

Figure 3. Straight forceps



Forceps have been in use since the 17th century, and their skilled use is still regarded as safe. However, as with all instruments, forceps have significant potential for harm when used inappropriately. Specifically, relative to ventouse, forceps tend to be associated with:

- Increased risk of maternal trauma (OR 1.6)
- Reduced risk of failure to achieve vaginal birth (OR 0.3) (7)

Failure to deliver the baby using the primary instrument will then necessitate the use of either a second instrument or a Caesarean section – both of which are associated with significantly poorer outcomes than a successful primary delivery using any instrument (1,29). In this context, a decision to use an instrument that is associated with greater maternal trauma in isolation may be justified by a reduction in risks (for both mother and baby) associated with delivery using either a second instrument, or Caesarean section.

Rotational operative birth

A rotational operative birth is any birth in which the orientation (position) of the fetal head requires correction by the obstetrician prior to delivery. These births are associated with greater risk of failure (7,30) and are acknowledged as being technically more complex and requiring a sufficiently experienced operator (31). However, despite this background, there is good evidence that in skilled hands rotational operative births are safer than the alternative (a Caesarean section) (32).

Therefore, it is reasonable for these births to be attempted, providing the following conditions are met:

- Conducted in theatre (7) – can be dependent on operator experience
- Performed by a suitably trained and experienced operator
- Potential complications (such as shoulder dystocia) are specifically acknowledged and anticipated for (33)

Rotational OVBs can be conducted using either rotational (Kiellands) forceps, rotational ventouse or using manual rotation followed by direct forceps. There is no conclusive evidence as to which of these methodologies is superior to each other, although some recent studies and a meta-analysis have found that rotational forceps are superior to manual rotation followed by direct forceps, and there is a lower failure rate than ventouse (33,34).

Know when to abandon

The RCOG recommends that the procedure should be abandoned where there is no evidence of progressive descent with moderate traction during each contraction or where birth is not imminent following three contractions of a correctly applies instrument by an experience operator.

The RCOG guideline for OVB also explains that the bulk of malpractice litigation results from failure to abandon the procedure at the appropriate time, particularly the failure to eschew prolonged, repeated or excessive traction efforts in the presence of poor progress.

If there is difficulty in applying the instrument correctly, no descent with each traction, birth is not imminent following three pulls and/or a reasonable time has elapsed since the decision for intervention has been made, then the attempt at operative vaginal birth should be abandoned.

Use of sequential instruments

As previously discussed, the use of sequential instruments is associated with greater harm than either a successful primary OVB, or a primary Caesarean section (29). However, following a failure to deliver using the first instrument (usually a ventouse), if there has been significant descent of the head, it may be safer and therefore reasonable to proceed to use a second instrument (usually forceps), due to the significantly increased complexity and potential trauma associated with a Caesarean section when the fetal head is deep within the pelvis. While such a decision to proceed with a second instrument may be reasonable, it should be explicitly justified and documented by the practitioner (7). It would not usually be justifiable to use ventouse after the failure of an attempted forceps birth.

Role of episiotomy

An episiotomy is a cut made into the sidewall of the vagina with the intention of widening the vaginal opening to speed delivery of the baby and/or to reduce the chance of an obstetric anal sphincter injury (also known as third/fourth degree tears or OASI).
When performing an OVB, it is not mandatory to perform an episiotomy, as there is no prospective, sufficiently powered evidence to demonstrate that this strategy reduces the chances of an anal sphincter tear or longer-term urinary or faecal incontinence (7,35,36).
There is however a body of retrospective evidence suggesting that an episiotomy may, in the context of OVB, be protective against OASI – a review of all births to primiparous women in England between 2000 to 2012 showed the following rates of OASI: (37)

Mode of birth	% chance of OASI
Normal birth, no episiotomy	3.4
Normal birth, with episiotomy	2.2
Ventouse, no episiotomy	6.4
Ventouse, with episiotomy	2.3
Forceps, no episiotomy	22.7
Forceps, with episiotomy	6.1

Therefore while practitioners may or may not perform an episiotomy dependent on their clinical judgement of the situation, a decision to perform an episiotomy would be unlikely to be criticised.

Following any OVB, careful digital examination per rectum should be made to exclude OASI, and if found, it should be repaired using described techniques. (38)

Documentation

Defending a potential claim can be extremely difficult unless there is good documentation for the operative birth, including: indications, examination findings and performance of the operative vaginal birth.

Experts or judges reviewing a case often deem that meticulous documentation reflects meticulous care and also 'If it isn't documented then it didn't happen'. The quality of documentation can reflect a clinician's level of professionalism and forms the basis of any successful defence of a claim or complaint. Claims are twice as likely to be successfully defended if documentation is judged to be adequate.

Good record keeping is also essential for education, clinical audit and risk management purposes. The following elements of the birth should be documented and a standardized proforma may help:

Indication for procedure
Consent
Pre-procedure assessment
    Abdominal palpation
    Position and station of the fetal head
    Degree of caput and moulding
    Fetal heart assessment
Ease of application of instrument
Type of rotation
Number of pulls
Use of sequential instruments
Condition of the baby
Assessment of vagina and perineum post birth
Paired cord pH results

Conclusion

There is a balance of risks and benefits with operative birth and obstetricians are often faced with dilemma of making difficult choice between operative vaginal birth and Caesarean section when birth needs to be expedited at full cervical dilatation. Even for experienced clinicians, this decision-making process can be extremely challenging particularly where experience with operative birth is limited.

There is now clear guidance from the RCOG and other Colleges for both decision making about, and performance of, operative birth and these have become the standard of care.

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